

calcined MgO in CKD not recycled to the kiln for each kiln (as wt-fractions).

(9) Method used to determine non-calcined CaO and non-calcined MgO in CKD.

(10) Monthly kiln-specific clinker CO₂ emission factors for each kiln (metric tons CO₂/metric ton clinker produced).

(11) Quarterly kiln-specific CKD CO₂ emission factors for each kiln (metric tons CO₂/metric ton CKD produced).

(12) Annual organic carbon content of each raw material (wt-fraction, dry basis).

(13) Annual consumption of each raw material (dry basis).

(14) Number of times missing data procedures were used to determine the following information:

(i) Clinker production (number of months).

(ii) Carbonate contents of clinker (number of months).

(iii) Non-calcined content of clinker (number of months).

(iv) CKD not recycled to kiln (number of quarters).

(v) Non-calcined content of CKD (number of quarters).

(vi) Organic carbon contents of raw materials (number of times).

(vii) Raw material consumption (number of months).

§ 98.87 Records that must be retained.

(a) If a CEMS is used to measure CO₂ emissions, then you must retain under this subpart the records required for the Tier 4 Calculation Methodology in § 98.37.

(1) Documentation of monthly calculated kiln-specific clinker CO₂ emission factor.

(2) Documentation of quarterly calculated kiln-specific CKD CO₂ emission factor.

(3) Measurements, records and calculations used to determine reported parameters.

(b) If a CEMS is not used to measure CO₂ emissions, then in addition to the records required by § 98.3(g), you must retain the records specified in paragraphs (a) through (b) of this section for each portland cement manufacturing facility.

§ 98.88 Definitions.

All terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

Subparts I–J [Reserved]

Subpart K—Ferroalloy Production

§ 98.110 Definition of the source category.

The ferroalloy production source category consists of any facility that uses pyrometallurgical techniques to produce any of the following metals: ferrochromium, ferromanganese, ferromolybdenum, ferronickel, ferrosilicon, ferrotitanium, ferrotungsten, ferrovanadium, silicomanganese, or silicon metal.

§ 98.111 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a ferroalloy production process and the facility meets the requirements of either § 98.2(a)(1) or (2).

§ 98.112 GHGs to report.

You must report:

(a) Process CO₂ emissions from each electric arc furnace (EAF) used for the production of any ferroalloy listed in § 98.110.

(b) CO₂, CH₄, and N₂O emissions from each stationary combustion unit following the requirements of subpart C of this part. You must report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources).

§ 98.113 Calculating GHG emissions.

You must calculate and report the annual process CO₂ emissions from each EAF using the procedures in either paragraph (a) or (b) of this section.

(a) Calculate and report under this subpart the process CO₂ emissions by operating and maintaining CEMS according to the Tier 4 Calculation Methodology in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(b) Calculate and report under this subpart the annual process CO₂ emissions using the procedure in either paragraph (b)(1) or (b)(2) of this section.

(1) Calculate and report under this subpart the annual process CO₂ emissions from EAFs by operating and maintaining a CEMS according to the Tier 4 Calculation Methodology specified in § 98.33(a)(4) and the applicable requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(2) Calculate and report under this subpart the annual process CO₂ emissions from the EAFs using the carbon mass balance procedure specified in

paragraphs (b)(2)(i) and (b)(2)(ii) of this section.

(i) For each EAF, determine the annual mass of carbon in each carbon-containing input and output material for the EAF and estimate annual process CO₂ emissions from the EAF using Equation K-1 of this section. Carbon-containing input materials include carbon electrodes and carbonaceous reducing agents. If you document that a specific input or output material contributes less than 1 percent of the total carbon into or out of the process, you do not have to include the material in your calculation using Equation K-1 of this section.

$$\begin{aligned}
 E_{\text{CO}_2} = & \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^i \left(M_{\text{reducing agent}_i} \times C_{\text{reducing agent}_i} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^m \left(M_{\text{electrode}_m} \times C_{\text{electrode}_m} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^h \left(M_{\text{ore}_h} \times C_{\text{ore}_h} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^j \left(M_{\text{flux}_j} \times C_{\text{flux}_j} \right) \\
 & - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^k \left(M_{\text{product outgoing}_k} \times C_{\text{product outgoing}_k} \right) \\
 & - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^l \left(M_{\text{non-product outgoing}_l} \times C_{\text{non-product outgoing}_l} \right)
 \end{aligned}
 \tag{Eq. K-1}$$

Where:

E_{CO_2} = Annual process CO₂ emissions from an individual EAF (metric tons).

44/12 = Ratio of molecular weights, CO₂ to carbon.

2000/2205 = Conversion factor to convert tons to metric tons.

$M_{\text{reducing agent}_i}$ = Annual mass of reducing agent i fed, charged, or otherwise introduced into the EAF (tons).

$C_{\text{reducing agent}_i}$ = Carbon content in reducing agent i (percent by weight, expressed as a decimal fraction).

$M_{\text{electrode}_m}$ = Annual mass of carbon electrode m consumed in the EAF (tons).

$C_{\text{electrode}_m}$ = Carbon content of the carbon electrode m (percent by weight, expressed as a decimal fraction).

M_{ore_h} = Annual mass of ore h charged to the EAF (tons).

C_{ore_h} = Carbon content in ore h (percent by weight, expressed as a decimal fraction).

M_{flux_j} = Annual mass of flux material j fed, charged, or otherwise introduced into the EAF to facilitate slag formation (tons).

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C_{fluxj} = Carbon content in flux material j (percent by weight, expressed as a decimal fraction).

$M_{productk}$ = Annual mass of alloy product k tapped from EAF (tons).

$C_{productk}$ = Carbon content in alloy product k . (percent by weight, expressed as a decimal fraction).

$M_{non-product outgoingl}$ = Annual mass of non-product outgoing material l removed from EAF (tons).

$C_{non-product outgoingl}$ = Carbon content in non-product outgoing material l (percent by weight, expressed as a decimal fraction).

(ii) Determine the combined annual process CO₂ emissions from the EAFs at your facility using Equation K-2 of this section.

$$CO_2 = \sum_1^k E_{CO2k} \quad (\text{Eq. K-2})$$

Where:

CO_2 = Annual process CO₂ emissions from EAFs at facility used for the production of any ferroalloy listed in § 98.110 (metric tons).

E_{CO2k} = Annual process CO₂ emissions calculated from EAF k calculated using Equation K-1 of this section (metric tons).

k = Total number of EAFs at facility used for the production of any ferroalloy listed in § 98.110.

(c) If GHG emissions from an EAF are vented through the same stack as any combustion unit or process equipment that reports CO₂ emissions using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part (General Stationary Fuel Combustion Sources), then the calculation methodology in paragraph (b) of this section shall not be used to calculate process emissions. The owner or operator shall report under this subpart the combined stack emissions according to the Tier 4 Calculation Methodology in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part.

(d) For the EAFs at your facility used for the production of any ferroalloy listed in Table K-1 of this subpart, you must calculate and report the annual CH₄ emissions using the procedure specified in paragraphs (d)(1) and (2) of this section.

(1) For each EAF, determine the annual CH₄ emissions using Equation K-3 of this section.

$$E_{CH4} = \sum_1^i \left(M_{producti} \times \frac{2000}{2205} \times EF_{producti} \right) \quad (\text{Eq. K-3})$$

Where:

E_{CH4} = Annual process CH₄ emissions from an individual EAF (metric tons).

$M_{producti}$ = Annual mass of alloy product i produced in the EAF (tons).

2000/2205 = Conversion factor to convert tons to metric tons.

$EF_{producti}$ = CH₄ emission factor for alloy product i from Table K-1 in this subpart (kg of CH₄ emissions per metric ton of alloy product i).

(2) Determine the combined process CH₄ emissions from the EAFs at your facility using Equation K-4 of this section:

$$CH_4 = \sum_1^j E_{CH4j} \quad (\text{Eq. K-4})$$

Where:

CH₄ = Annual process CH₄ emissions from EAFs at facility used for the production of ferroalloys listed in Table K-1 of this subpart (metric tons).

E_{CH4j} = Annual process CH₄ emissions from EAF j calculated using Equation K-3 of this section (metric tons).

j = Total number of EAFs at facility used for the production of ferroalloys listed in Table K-1 of this subpart.

§ 98.114 Monitoring and QA/QC requirements.

If you determine annual process CO₂ emissions using the carbon mass balance procedure in § 98.113(b)(2), you must meet the requirements specified in paragraphs (a) and (b) of this section.

(a) Determine the annual mass for each material used for the calculations of annual process CO₂ emissions using